

3MA System Evaluation For ISLOCA

3MA.1 General Comments About the Appendix

This Attachment discusses each of the systems evaluated in detail, presented in the order listed in Appendix 3M, and following a repetitive outline format.

The first section, “System URS Boundary Description,” describes the piping segments within the system that are classified as URS boundary.

The second section, “Downstream Interfaces,” discusses the systems that interface with the subject system, that could potentially be pressurized by reactor pressure passed through (downstream) the subject system. Each downstream system is dispositioned as being either not applicable or applicable for URS design pressure and the topic of another Attachment 3MA section.

The third section, “Low-Pressure Piping Systems and Components Designed to URS Pressure,” provides a listing of the low-pressure piping systems and components that are designed to the minimum URS design pressure of 2.82 MPaG. This section provides a listing of URS applicable system pipeline codes and components as shown on the system P&IDs (PSAR Figure numbers for system P&IDs are shown in Section 3M.5). All components shown within the listed pipeline code boundaries, as shown on the system P&IDs, will be designed to the URS design pressure specified above. Pipeline codes and components that are not listed in this section either have a design pressure that is higher than the URS design pressure because of consideration other than ISLOCA, or the URS design pressure is not applicable to the subject piping or component because it is outside the URS boundary. Otherwise, it must be proven that designing the subject low-pressure piping system or component to the URS design pressure is not practical. If proven to be impractical, the piping system or component that interfaces with RCPB must be designed based on the criteria outlined in Section 3M.2.

3MA.2 Residual Heat Removal System

3MA.2.1 System URS Boundary Description

RHR has two suction sources, one from the suppression pool and the other from the RPV as used for shutdown cooling. The suction piping also includes the keep-fill pump and its piping.

The URS boundary is terminated at the last valve before the suppression pool. The suppression pool is a large structure, designed to 0.310 MPaG and impractical to upgrade to the URS design pressure.

The other suction branch to the RPV is not a URS boundary because it interfaces to the high pressure RPV. The only portion of RHR that is not designed to the URS design pressure is the unobstructed piping to the suppression pool.

3MA.2.2 Downstream Interfaces

Other systems are listed below that interface with RHR and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Condensate Storage and Transfer System (CSTF) upstream of the injection valve for the purpose of providing a filling and flushing water source. Another interface with CSTF is between the pair of valves to the Fuel Pool Cooling and Cleanup System (FPCU). CSTF is discussed in Section 3MA.11, where it is explained how the CSTF design provides an open path to the condensate storage tank (CST). The CSTF line cannot be pressurized because of the open communication to the CST, and the CST is vented to atmosphere. There is no source to pressurize the CSTF line because of closed valves in the RHR URS region.
- Radwaste Sumps (SUMP) - High Conductivity Waste (HCW) for drainage located up stream of the pump suction. SUMP - HCW is discussed in Section 3MA.13.
- Radwaste Sumps (SUMP) - Low Conductivity Waste (LCW) at the end of a branch off of the loop B mainline down stream of the RHR heat exchanger. Interface with the LCW Reactor Building sump which is vented to atmosphere, is through open funnel drains with low pressure piping to the sump. SUMP - LCW is discussed in Section 3MA.13.
- Reactor Building Sampling System (RBS) at the outlet of the RHR heat exchanger. RBS design pressure exceeds the URS design pressure without upgrade.
- Fuel Pool Cooling and Cleanup System (FPCU) on an RHR System discharge branch. FPCU is discussed in Section 3MA.8.
- Flammability Control System (FCS) branches off the main discharge line downstream of the branch that returns to the suppression pool. The FCS design pressure exceeds the URS design pressure without upgrade.
- The Fire Protection System (FP) and the fire truck connection provide water for the Alternating Current (AC) Independent Water Addition piping of RHR loop C upstream of the RPV injection, wetwell spray line, and drywell spray line. FP piping is designed for 1.37 MPaG and is protected from over pressure by two locked closed block and bleed valves, and a drain pipe between these valves vented to the HCW sump in the Reactor Building. This design very effectively prevents reactor pressure from reaching FP. No upgrade to URS is practical or appropriate for the extensive piping of FP since the system function is not related to ISLOCA nor is its interconnection a normal plant operational pathway.

3MA.2.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within RHR that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

RESIDUAL HEAT REMOVAL SYSTEM (RHR), PSAR Figure 5.4-10, Sheets 1 through 10.

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1E11- L-D	Pump Suction and Branch Piping and Associated Components
1E11- L-I	Independent AC Water Addition Piping and Associated Components

3MA.3 High Pressure Core Flooder System (HPCF)**3MA.3.1 System URS Boundary Description**

HPCF has two suction sources, the primary source being the condensate storage tank (CST) and the suppression pool as an alternate.

The URS boundary was terminated at the last HPCF valve in the pipeline to the CST. Beyond this valve, the pipeline is open to the CST except for three locked open maintenance valves in parallel adjacent to the CST. The pipeline to the CST is a large pipe (500 mm) providing a common supply to HPCF, Reactor Core Isolation Cooling System (RCIC), and Suppression Pool Cleanup System (SPCU). Because of the open communication to the CST, and the CST is vented to atmosphere, this line cannot be pressurized. The CST is a large structure, impractical to upgrade to the URS design pressure.

The URS boundary was terminated at the last valve before the suppression pool, which is a normally closed valve. The suppression pool is a large structure, impractical to upgrade to the URS design pressure. The only portions of HPCF that are not upgraded to the URS design pressure is unobstructed piping to the suppression pool.

3MA.3.2 Downstream Interfaces

Other systems are listed below that interface with HPCF and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Condensate Storage and Transfer System (CSTF) upstream of the injection valve for the purpose of providing the piping keep-fill water source and a filling and flushing water source. CSTF is discussed in Section 3MA.11, where it is explained how the CSTF design

provides an open path to the CST. The CSTF line cannot be pressurized because of the open communication to the CST, and the CST is vented to atmosphere.

There is no source to pressurize the CSTF line because of closed valves in the HPCF URS region.

- Radwaste Sumps (SUMP) - High Conductivity Waste (HCW) for drainage is located downstream of the CST suction valve. HCW is discussed in Section 3MA.13.

3MA.3.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within HPCF that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

HIGH PRESSURE CORE FLOODER SYSTEM (HPCF), PSAR Figure 6.3-7, Sheets 1 and 2.

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1E22- L-E	Common Pump Suction from CST and Suppression Pool Piping and Associated Components

3MA.4 Reactor Core Isolation Cooling System

3MA.4.1 System URS Boundary Description

RCIC has two suction sources, the primary source being the CST and the suppression pool as an alternate.

The URS boundary was terminated at the last RCIC valve in the pipeline to the CST. Beyond this valve, the pipeline is open to the CST except for three locked open maintenance valves in parallel adjacent to the CST. The pipeline to the CST is a large pipe (500 mm) providing a common supply to RCIC, HPCF, and SPCU. Because of the open communication to the CST, and the CST is vented to atmosphere, this line cannot be pressurized. The CST is a large structure, impractical to upgrade to the URS design pressure.

The URS boundary was terminated at the last valve before the suppression pool, which is a normally closed valve. The suppression pool is a large structure, impractical to upgrade to the URS design pressure. The only portions of RCIC that are not upgraded to the URS design pressure is unobstructed piping to the suppression pool.

3MA.4.2 Downstream Interfaces

Other systems are listed below that interface with RCIC and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Condensate Storage and Transfer System (CSTF) upstream of the injection valve for the purpose of providing the piping keep-fill water source and a filling and flushing water source. CSTF is discussed in Section 3MA.11.
- Radwaste Sumps (SUMP) - High Conductivity Waste (HCW) for drainage is located downstream of CST suction check valve. HCW is discussed in Section 3MA.13.
- RCIC shares common CST suction. The CST suction has open communication to the CST, and the CST is vented to atmosphere; this line cannot be pressurized and was not practical to upgrade to the URS design pressure.
- Suppression Pool Cleanup System (SPCU) shares common CST suction with RCIC. The CST suction has open communication to the CST, and the CST is vented to atmosphere; this line cannot be pressurized and was not practical to upgrade to the URS design pressure.

3MA.4.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within RCIC that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

REACTOR CORE ISOLATION COOLING SYSTEM (RCIC), PSAR Figure 5.4-8, Sheets 1 through 3.

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1E51- L-F	Leakage Steam Piping and Associated Components
1E51- L-J	Main Suction and Lube Oil Cooling Piping and Associated Components
1E51- L-N	Condenser Condensate Piping and Associated Components
1E51- L-S	Condenser Steam Return Piping and Associated Components
1E51- L-U	Barometric Condenser Condensate Piping and Associated Components
1E51- L-V	High Pressure / High Temperature Interface Piping and Associated Components
1E51- L-W	Leakage Steam Return Piping and Associated Components

3MA.5 Control Rod Drive System (CRD)

3MA.5.1 System URS Boundary Description

The CRD System interfaces with the reactor in a manner that makes low pressure piping over pressurization very unlikely. The minimum failure path from the reactor to the low pressure piping has three check valves in series and the second check valve is 1.27 cm in size. This path is from the purge flow channels of the CRD, out through the first check valve in the CRD housing, through the purge supply line that has the second 1.27 cm check valve, and to the pump discharge check valve. An alternate path through the accumulator charging line has additionally the normally closed scram valve, and this path is less likely for failure, therefore not considered. The path from the pump discharge, back through the pump to its suction, and back through the suction lines to the condensate storage tank or the condensate feedwater source is an open path. The open pump suction pipeline is a minimum 100 mm diameter except for a 150 mm diameter attachment to the condensate storage tank (CST). The CRD pumps run continuously while the reactor is at operating pressure, which prevents reactor pressure from reaching the low pressure piping unless for the unlikely case when both CRD pumps have failed. Therefore, an ISLOCA condition from a 12.7 mm diameter source could only occur when three check valves in series fail open at the same time both CRD pumps have failed. The ISLOCA guidelines do not provide credit for this rare condition, so the low pressure piping has been upgraded to the URS design criteria over the entire low pressure piping region of the CRD system. The suction path through the Condensate Storage and Transfer System (CSTF) to the CST from the CRD interface is an open path whose design pressure was not upgraded to URS design criteria. The piping design of the primary suction path through the Condensate, Feedwater and Condensate Extraction System has not been established, but if a check valve is in the path, the design pressure up to and including the check valve will be the URS design pressure.

The normal key assumption, as stated in the Boundary Limits of URS section above, that the valve adjacent to a low pressure sink remains closed, means that the pump discharge check valve remains closed as a given. However, this valve is in the high pressure piping, which is unique for the CRD system. according to this accepted line of reasoning. The low pressure piping would not have to be upgraded because it would not experience the high reactor pressure. However, the low-pressure piping has been has been designed to the URS design pressure based on the guidance that states “for all interfacing systems and components which do not meet the full URS criteria, justification is required, which must include engineering feasibility; not solely a risk benefit analysis.” Designing the low-pressure piping to the URS design pressure is feasible and was done.

3MA.5.2 Downstream Interfaces

Other systems are listed below that interface with the CRD system and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Reactor Water Cleanup System (RWCU) at the output of the filter units. The RWCU design pressure exceeds the URS design pressure without upgrade.
- Reactor Recirculation System (RCIR) purge water supplied by the CRD system, has a 8.83 MPaG design pressure, which exceeds the URS design pressure and needs no upgrade.
- Condensate Storage and Transfer System (CSTF) provides pump suction from and system return to the CST. CSTF is discussed in Section 3MA.11, where it is explained how the CSTF design provides an open path to the CST. This line cannot be pressurized because of the open communication to the CST, and the CST is vented to atmosphere. There is no source to pressurize the CSTF line because of closed pump discharge check valves in the CRD URS region.
- Condensate, Feedwater and Air Extraction system provides pump suction from the turbine building condensate supply. This system is expected to be an open path to a large source similar to CSTF. Because of the open path, the piping was not considered practical for upgrade to the URS design pressure.
- Reactor Building Sampling System (RBS) at the output of the RWCU filter units. The RBS design pressure exceeds the URS design pressure without upgrade.
- Feedwater System (FW) at a branch off of the CRD purge line provides the water for conducting RPV hydro tests and the 18.6 MPaG design pressure exceeds the URS design pressure and needs no upgrade.

3MA.5.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within CRD that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

CONTROL ROD DRIVE SYSTEM (CRD), PSAR Figure 4.6-8, Sheets 1 through 23

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1C12- L-D	CRD Pump Suction Piping and Associated Components

3MA.6 Standby Liquid Control System (SLC)

3MA.6.1 Upgrade Description

SLC interfaces with the reactor through the HPCF injection piping inside the drywell. The leakage path includes three 40 mm check valves in series with normally closed motor operated valves in addition to the positive displacement pumps piped in parallel. A 40 mm nominal pipe size test pipe from the pump discharge piping to the test tank has two normally closed valves

in series. All of these valves have leakage test features. Short monthly pump operating tests produce demineralized water flow through the test tank.

The 100 mm pump suction piping between the pumps, the storage tank outlet valve, the test tank and the Makeup Water System (MW) interface is designed to URS design criteria. The SLC storage tank is vented to atmosphere and serves as the pressure release sink connecting to the outermost pump suction piping valves.

All low pressure instrumentation, pressure relief, drain piping and valving are designed to URS design criteria to reduce the level of pressure challenge to these components.

3MA.6.2 Downstream interfaces

Other systems are listed below that interface with SLC and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Makeup Water System (MW) 80 mm piping interface occurs at the SLC check valve connected to a branch off the test loop suction pipe. This SLC branch piping consists of a normally closed flushing valve and a normally open 20 mm suction piping pressurizing valve to prevent borated solution migrating to the SLC injection pump suction piping. Refer to Section 3MA.12 for upgrade information on MW.
- MW also provides the makeup water to the SLC storage tank through block and bleed valves and a piping drain to a portable container to prevent leakage of additional makeup into the SLC storage tank which could dilute the borate solution in the tank.

3MA.6.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within SLC that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

STANDBY LIQUID CONTROL SYSTEM (SLC), PSAR Figure 9.3-1, Sheet 1.

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1C41- L-A	SLC Pump Suction Piping and Associated Components
1C41- L-D	SLC Test Tank / Demineralized Water Supply Piping and Associated Components
1C41- L-F	Demineralized Water Supply Piping and Associated Components

3MA.7 Reactor Water Cleanup System (RWCU)**3MA.7.1 System URS Boundary Description**

The Reactor Water Cleanup system (RWCU) is a high pressure system that is almost totally designed above the URS design pressure. One low-pressure pipe connected to Radwaste Sumps (SUMP) LCW collector tank is designed to the URS design pressure.

3MA.7.2 Downstream Interfaces

A system is listed below that interfaces with RWCU and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- Radwaste Sumps (SUMP) - low conductivity waste, (LCW) connects to a branch of the RWCU filter/demineralizer discharge. There is not a practical reason to upgrade this interface in RWCU as discussed in the SUMP Section 3MA.13.

3MA.7.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within RWCU that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

REACTOR WATER CLEANUP SYSTEM (RWCU), PSAR Figure 5.4-12, Sheets 1 through 6.

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1G31- L-P	RWCU Blowdown to LCW Piping and Associated Components

3MA.8 Fuel Pool Cooling Cleanup System (FPCU)**3MA.8.1 Upgrade Description**

The Fuel Pool Cooling and Cleanup System (FPCU) interfaces with RHR at two locations that could possibly expose the FPCU to reactor pressure. One location is the discharge from the FPCU to RHR in the line downstream from the skimmer surge tank; the other location is the RHR return to FPCU in the line to the reactor well and spent fuel pool.

A testable check valve and gate valve are provided in the discharge piping from the FPCU to RHR. The gate valve is locked open and the check valve allows flow into the skimmer surge tank. This valve arrangement provides an open path into the skimmer surge tank to prevent overpressurization of this piping. All the low-pressure interfacing piping between FPCU and RHR is designed to the URS design pressure of 2.82 MPaG.

The second interface, the RHR return to FPCU in the line to the reactor well and spent fuel pool, is not required to be designed to the URS design pressure because of the continuous open path to the spent fuel storage pool and cask pit.

3MA.8.2 Downstream Interfaces

The fuel pool cleanup system has no further downstream system interfaces that could allow reactor pressure from RHR to proceed further than FPCU.

3MA.8.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within FPCU that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

FUEL POOL COOLING AND CLEANUP SYSTEM (FPCU), PSAR Figure 9.1-1, Sheets 1 through 4.

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1G41- L-B	Surge Tank and Filter Demineralizer to RHR Piping and Associated Components

3MA.9 Main Steam System (MS)

3MA.9.1 System URS Boundary Description

The Main Steam System (MS) piping and instrumentation is designed for reactor pressure and does not require upgrade to URS design pressure.

3MA.9.2 Downstream Interfaces

Other systems are listed below that interface with MS and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

CRD, RCIC, RPV, RHR, HPCF, and RWCU are high pressure interfaces of MS and SUMP (LCW and HCW) are low pressure interfaces of MS. Interfacing systems at high pressure have low pressure interfaces addressed in their specific system listings.

3MA.9.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

None

3MA.10 Reactor Recirculation System (RCIR)

3MA.10.1 System URS Boundary Description

Ten Reactor Internal Recirculation Pumps (RIPs) are installed around the perimeter of the reactor vessel and operate at reactor pressure.

3MA.10.2 Downstream Interfaces

Other systems are listed below that interface with RCIR and could possibly be exposed to reactor pressure. A description of the interface location and a statement of its applicability to ISLOCA is given.

- MW interfaces with each reactor recirculation pump to provide RIP casing makeup water. Another MW interface exists during refueling or maintenance shutdown to provide water for the RIP shaft inflatable seal subsystem. MW is described in Section 3MA.12.
- Reactor Building Cooling Water System (RBCW) interfaces with each RCIR RIP motor cooling subsystem through a heat exchanger designed for 8.62 MPaG and utilizes RBCW water for cooling the RIP motors. No upgrade is needed for the RBCW connecting piping designed to 1.37 MPaG.
- CRD piping connects to the ten RIP motor purge subsystems. No upgrade is required because the design pressure for both CRD and RCIC is 18.63 MPaG.
- Radwaste Sumps (SUMP) Open funnel drain piping connects to the LCW and HCW sumps in the drywell.
- Makeup Water System (MW) PSAR Figure 9.2-5 shows other components interfacing with RCIR. These are not upgraded because they are part of the open pathway to the condensate storage tank (CST) which is vented to the atmosphere. Another MW interface is connected to a portable inflatable shaft seal pump and tank only during refueling or when the reactor is shut down for maintenance.

3MA.10.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within RCIR that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

REACTOR RECIRCULATION SYSTEM (RCIR), PSAR Figure 5.4-4, Sheets 1 through 11.

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1B31- L-E	Recirculation Motor Inflatable Shaft Seal Subsystem Supply Piping and Associated Components

3MA.11 Condensate Storage and Transfer System (CSTF)

3MA.11.1 Condensate Storage and Transfer System (NI Scope)

3MA.11.1.1 System URS Boundary Description

CSTF has extensive system interfaces throughout the plant for makeup water to fill systems and serve flushing connections. The extent of the piping and the size of the condensate storage tank (CST) of CSTF makes it impractical to upgrade to the URS design pressure. Instead, valves that interface with high pressure systems are locked open to create a clear path from the URS boundary to the CST which is vented to atmosphere.

3MA.11.1.2 Downstream Interfaces

- HPCF is a downstream interface of CSTF at three outlets of the CST. CRD piping is not upgraded to the URS design pressure because the maximum static head is 0.159 MPaG. The first closed valve of the HPCF suction piping is designed to URS design pressure based on data provided in Section 3M.3.
- CRD System 150 mm suction piping interfaces with the CST.
- Other interfaces include the HPCF fill line, RHR flushing lines, CRD makeup and discharge, and MW which are not designed to URS pressure due to the impractical nature of upgrades for such an extensive piping system with locked open valves and open piping paths to the vented CST.
- All CSTF valves between the interfacing system connections and the CST are locked open to provide an open pathway to relieve pressure to this tank which is vented to the atmosphere.

3MA.11.1.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within CSTF that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

CONDENSATE STORAGE AND TRANSFER SYSTEM (CSTF), PSAR Figure 9.2-4, Sheets 1 and 2.

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1P13- L-A	CRD Suction / Condensate Pressure Breakdown Piping and Associated Components
1P13- L-D	Safety-Related Line for Standpipe Isolation Piping and Associated Components

3MA.11.2 Condensate Storage and Transfer System (BOP Scope)

Because the Condensate Storage and Transfer System is within the BOP scope of supply, information consistent with the rest of this section will be provided in the FSAR as it is developed during detailed design activities.

3MA.12 Makeup Water System (MW)**3MA.12.1 Makeup Water System (NI Scope)****3MA.12.1.1 URS Boundary Description**

MW is not upgraded due to the extensive nature of the piping distribution, but instead all valves between the interface of potential reactor pressure sources and the condensate storage tank (CST) are designed to the locked open. This provides a clear path for the release of pressure to the CST which is vented to atmosphere. The potential reactor pressure sources are SLC makeup seal, the RCIR ten RIP casing makeup water connections, and shaft (RIP) inflatable seal capped connections. The piping and valves connected to the RIPs within the primary containment are designed to the URS design pressure.

3MA.12.1.2 Downstream Interfaces

MW has no further downstream system interfaces that could allow reactor pressure to proceed further than MW.

3MA.12.1.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The following is a listing of low-pressure piping systems and components within MW that are designed to the minimum URS design pressure of 2.82 MPaG based on the ISLOCA considerations outlined in Appendix 3M.

MAKEUP WATER SYSTEM (MW) PSAR Figure 9.2-5, Sheets 1 through 4.

<u>Pipeline Code</u>	<u>Pipeline / Component Description</u>
1P11- L-B	Containment Penetration Piping and Associated Components
1P11- L-C	Distribution Header (Inside Containment) Piping and Associated Components

3MA.12.2 Makeup Water System (BOP Scope)

Because the Makeup Water System is within the BOP scope of supply, information consistent with the rest of this section will be provided in the FSAR as it is developed during detailed design activities.

3MA.13 Radwaste Systems**3MA.13.1 Radwaste Sumps (SUMP)****3MA.13.1.1 Upgrade Description**

SUMP LCW and HCW inlet piping header connects to each interfacing system at a valve. The header is not upgraded because it is an open pathway to the collection sumps which are vented to the Reactor Building HVAC system. A locked open maintenance valve is located at the inlet to the sump.

3MA.13.1.2 Downstream Interfaces

Since the Reactor Building HVAC System (RBHV) tank exhaust vents the LCW and HCW collection sumps and because they are all at atmospheric pressure, there are no downstream interfaces.

3MA.13.1.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

None

3MA.13.2 Other Radwaste Systems

Because the other radwaste systems are within the BOP scope of supply, information consistent with the rest of this section will be provided in the FSAR as it is developed during detailed design activities.

3MA.14 Condensate System (COND)**3MA.14.1 URS Boundary Description**

COND provides high pressure feedwater to the reactor, and all of the system is designed for high pressure except the condensate pumps suction. The high pressure design includes the condensate polishing (hollow fiber filters and demineralizers) units. The transition to low pressure occurs from the condensate suction into the LP condenser shell (hotwell). The hotwell is a low pressure sink. The last closed valve in the path from the reactor is the condensate pumps discharge check valve. The piping to the condensate pumps suction can remain below the URS design pressure because it connects to the low pressure heat sink hotwell. The maintenance block valves in the condensate pump suction lines are upgraded to a LOCK OPEN status.

3MA.14.2 Downstream Interfaces

None

3MA.14.3 Low-Pressure Piping Systems and Components Designed to URS Pressure

The maintenance block valves in the condensate pump suction lines are upgraded to a LOCK OPEN status.

3MA.15 Sampling Systems**3MA.15.1 Reactor Building Sampling System (RBS)****3MA.15.1.1 URS Boundary Description**

RBS receives water from several of the above systems, and an analysis, as presented below, resulted in not requiring any pressure upgrades. The following interfaces include all of the potential links of RBS to the reactor pressure, and since none of the individual portions needed upgrading, RBS as a whole was not upgraded.

- (1) RHR Interface: Samples can be taken downstream of the RHR heat exchanger, which is from a pipeline with a design pressure of 3.43 MPaG. RBS is designed for pressures at least as great as the point in the interfacing system where the sample is obtained. Therefore, the URS design pressure of 2.82 MPaG is exceeded and no upgrade was required for this portion of RBS.
- (2) SLC Interface: Manual grab samples can be taken from the SLC main tank, which is one of the low pressure sinks. Therefore, no upgrade was required for this portion of RBS.
- (3) RWCU Interface: Samples can be taken from the inlet and outlet of the filter demineralizer units, which are designed for full reactor pressure. RBS is designed for pressures at least as great as the point in the interfacing system where the sample is obtained. Therefore, the URS design pressure of 2.82 MPaG is exceeded and no upgrade was required for this portion of RBS.
- (4) FPCU Interface: Samples can be taken from the inlet to the filter demineralizer units and from the heat exchanger outlet. The pipeline sample points have a design pressure of 1.499 MPaG; however, this region of FPCU did not need upgrading to the URS design pressure. Therefore, no upgrade was required for this portion of RBS.
- (5) SUMP Interface: Manual grab samples can be taken from the LCW and HCW collector tanks, which are low pressure sinks. Therefore, no upgrade was required for this portion of RBS.

3MA.15.1.2 Downstream Interfaces

None

3MA.15.1.3 Upgraded Components

None

3MA.15.2 Turbine Building Sampling System (TBS)

TBS is within the BOP scope of supply. Information consistent with the rest of this section will be provided in the FSAR as it is developed during detailed design activities.